



DM6 Brake Unit User Manual

Wuxi XINJE Electric Co., Ltd.

Material Number: SM6 02 20250723

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Basic Description

- Thank you for purchasing the XINJE DM6 brake unit.
- This manual primarily provides product information for the DM6 brake unit.
- Before using the product, please read this manual carefully and connect the wiring only after fully understanding its contents.
- Please deliver this manual to the end user.

This manual is intended for reference by the following users

- Servo system designer
- Installation and Wiring Workers
- Trial Operation and Debugging Specialist
- Maintenance and Inspection Worker

Access methods for the manual

- Electronic Manual
Download the software from Xinje's official website www.xinje.com.

Disclaimer

- Although the content in the manual has been carefully verified, errors may still occur, and we cannot guarantee complete consistency.
- We will regularly review the manual content and make corrections in future versions. Your valuable feedback is welcome.
- Any changes to the content described in the manual will not be notified separately, please understand.

Contact way

If you have any questions regarding the use of this product, please contact the purchasing agent or office, or directly reach out to XINJE Company.

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Safety Precautions

Before using this product, please carefully read the content of this section and operate it only after fully understanding the usage, safety precautions, and other relevant information. Ensure proper wiring of the product with strict adherence to safety protocols.

Potential issues during product use are primarily documented in safety precautions, all labeled with either 'Caution' or 'Danger' classifications. For other unresolved matters, please adhere to basic electrical operating procedures.

	pay attention to	Improper use may result in hazards, including the risk of moderate injury or minor trauma, as well as potential property damage.
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	danger	Improper use may result in hazards, leading to personal injury or death, severe physical harm, and potentially causing significant property damage.
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Product Confirmation Notes

1. Do not install damaged drives, drives lacking components, or drives with non-compliant models.



Installation Notes

1. Before installing the wiring, please ensure to disconnect the power supply to prevent electric shock hazards.
2. Modifying this product is strictly prohibited, as is loosening the fixing bolts of its components and parts.
3. This product must not be used in environments containing water vapor, corrosive gases, flammable gases, or other hazardous substances, as it may pose risks of electric shock and fire.
4. Do not touch the conductive parts of the product directly, as it may cause unintended operation or malfunction.
5. Non-professional personnel are strictly prohibited from performing product installation, wiring, maintenance, inspection, or component replacement.



Precautions for wiring

1. Before wiring, ensure that the input power supply is disconnected to prevent the risks of electric shock and fire.
2. Please have electrical engineering professionals perform the wiring operations.
3. The grounding terminal must be reliably grounded.
There is a risk of electric shock and fire.
4. Do not touch the output terminals directly. The output terminals of the braking unit must not be connected to the housing, and short circuits between output terminals are strictly prohibited.
There is a risk of electric shock and short circuit.

5. After disconnecting the AC power supply, until the LED panel indicator lights of the braking unit turn off, this indicates that high voltage remains inside the unit—extremely hazardous. Do not touch any internal circuits or components.



Operational Instructions

1. After the braking unit is in operation, do not touch any wiring terminals of the equipment to avoid electric shock risk.
2. It is strictly prohibited to disassemble or install any devices or components during operation, as it poses an electric shock hazard.
3. Strictly prohibit touching the casing or resistors, as this may cause burns.
4. During operation, signal detection must be performed by qualified technical personnel; otherwise, it may cause personal injury or equipment damage.



Maintenance and Inspection

1. CMOS integrated circuits are installed on LED panels, control circuit boards, and driver circuit boards. Please exercise special caution during operation.
Direct finger contact with the circuit board may cause electrostatic induction damage to the integrated chips on the board.
2. Do not modify wiring or disconnect terminal connections during power supply. Do not inspect signals while in operation, as this may pose risks of electric shock or short circuit.

catalogue

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►► Product arrival confirmation

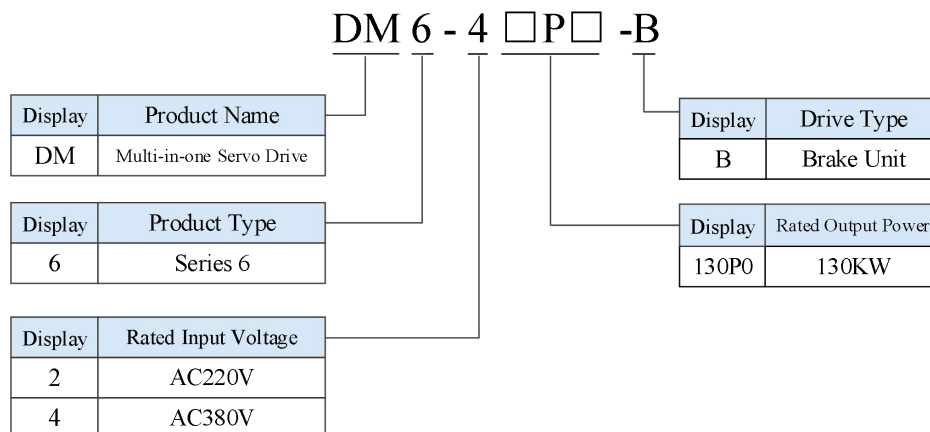
After product delivery, please verify its integrity in the following aspects.

Confirm item	remarks
Does the delivered product match the specified model?	Refer to the brake unit's nameplate for confirmation.
Are there any damaged areas?	Conduct a comprehensive visual inspection to check for any damage caused by transportation or other factors.
Are there any loose screws?	Check for any looseness with a screwdriver.

If any of the items listed above are found to be inappropriate, please promptly contact the product agent, office, or sales department of XINJE Company.

1 On-product Information

1.1 Model Naming



1.2 Electrical Specifications

Braking module model	Adapter driver input voltage	rated continuous stalling current (A)	maximum crest stalling current (A)	rated continuous brake power (KW)	Recommended rating braking resistor (Ω)	Minimum order dynamic resistance (Ω)	weight (kg)
DM6-4130P0-B	380V AC	200	300	130	3.5	2.5	6.99

1.3 Product Working Principle

1) Causes of braking

During motor speed regulation processes such as stopping or towing operations, the motor enters regenerative power generation mode, converting mechanical energy into electrical energy and feeding it back to the DC bus. Failure to promptly process this electrical energy may cause the DC bus voltage to rise, potentially damaging internal components of the servo driver.

2) Composition of the braking unit

The basic configuration includes a high-power transistor (IGBT) with its drive circuit and detection circuit. The IGBT serves as the critical electronic switching component within the braking unit,

responsible for controlling the on/off state of the braking current. The detection circuit continuously monitors the DC bus voltage, providing feedback signals to the control circuit.

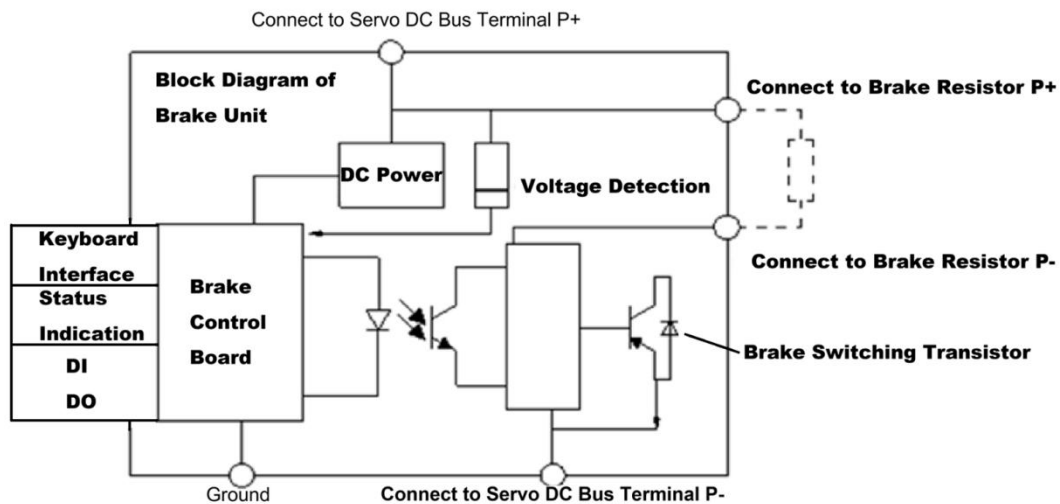
3) Brake unit control logic

During normal operation: Regenerative energy is generated during motor deceleration and braking processes, causing an increase in DC bus voltage. The driver monitors the DC bus voltage and, when it reaches a preset threshold, activates the braking unit's internal control circuit to turn on power devices. The braking resistor is then connected to the circuit, allowing regenerative energy to be dissipated as heat. This mechanism maintains the DC bus voltage within a safe range while protecting the equipment.

4) Working Principle

Before the braking unit operates normally, appropriate starting braking voltage (P0-01) and stopping braking voltage (P0-02) must be set according to the AC power supply voltage level of the drive unit. The voltage relationships between these braking voltages and the bus capacitor during normal operation are as follows: The braking unit monitors real-time bus voltage while the host system is running. If the bus voltage reaches the starting braking voltage P0-01, the unit activates and discharges energy through an external braking resistor. During this discharge process, if the bus voltage drops below the stopping braking voltage P0-02, the braking unit ceases operation.

5) Block diagram of brake unit principle



1.4 Selection of Brake Unit

The selection of brake units can refer to the following formula:

$$P_b = P * T_d * K$$

P_b — brake power ;

P — power of motor ;

K — Mechanical energy conversion efficiency, K typically ranges from 0.7;

T_d — Ratio of braking torque to rated motor torque.



T_d The value varies across different systems. For instance, in elevators, hoists, and cranes, it is generally 100%; for equipment with large inertia such as hoisting/unwinding systems and rapid stop mechanisms, it is typically 120%; while for ordinary inertial loads, it is usually 80%.

1.5 Braking resistor selection

When the servo motor is driven in generator mode, power returns to the servo amplifier side, which is referred to as regenerative power. The regenerative power is absorbed by charging the smoothing capacitor in the servo amplifier. After the energy exceeds the charging capacity, the regenerative power is dissipated through the braking resistor.

The scenario of servo generating renewable electricity is illustrated as follows:

- During deceleration operation or deceleration stop period;
- When the vertical axis runs downward;
- When an external load drives the motor to rotate.

Braking module model	Brake resistor connection terminal
DM6--□□P□-B	1) Connect the driver's P+ and P-terminals to the brake unit's corresponding P+ and P-terminals; 2) Please set the drive parameters as follows: P0-25 = power value, P0-26 = resistance value.

1) Power of the braking resistor

Considering a reduction rate of 70%, refer to the formula:

$$0.7 * P_r = P_b * E_D$$

P_r —Braking resistor power

E_D —Braking frequency



E_D The value varies across different systems. For instance, in elevators and winding/unwinding equipment, it generally ranges from 20% to 30%; for cranes and centrifugal machinery, it typically falls between 50% and 60%; while in other applications, it usually measures 5% to 10%.

2) Resistance Selection Formula

$$R = \frac{U^2}{P_b}$$

U – The braking voltage for stable braking



A 220V system typically

$U_d = \sqrt{2} \times 220V = 311V$, Keep a certain margin when taking $380V$ $U_d = \sqrt{2} \times 380V = 537V$, operates at $380V$ ($380V$ three-phase AC system), which corresponds to approximately $700V$ (with a safety margin of $700V$).

The table below lists the recommended external brake resistor specifications for various brake unit models.

Braking module model	Minimum resistance value Cannot be smaller than this value	External brake resistor (Recommended resistance value)	External brake resistor Recommended power value
DM6-4130P0-B	$\geq 2.5\Omega$	3.5Ω	130KW



- The smaller the resistance value, the faster the discharge rate. However, excessively low values may cause breakdown resistance. Therefore, during selection, it is advisable to approach the lower limit as closely as possible without falling below it.
- When wiring, use high-temperature resistant and flame-retardant wires, and ensure the surface of the braking resistor does not come into contact with the wires.

2 Mechanical and Electrical Installation

2.1 Installation of Brake Unit

2.1.1 installation site

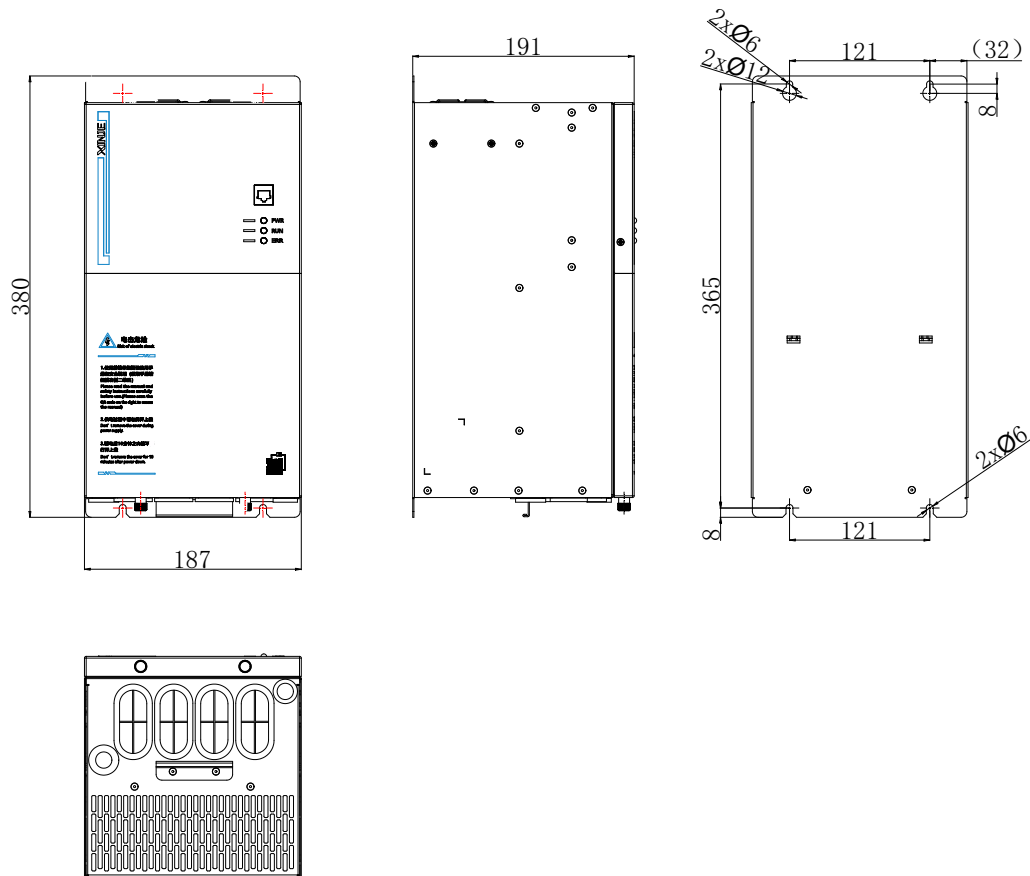
- Install in an enclosure protected from sunlight and rain.
- Do not use this product in environments containing corrosive or flammable gases such as hydrogen sulfide, chlorine, ammonia, sulfur, chlorinated gases, acids, alkalis, or salts, or near combustible materials.
- Do not install in environments with high temperature, humidity, dust, or metal particles.
- Install the brake unit in a vibration-free environment.

2.1.2 ambient condition

project	description
Use ambient temperature	-10~40°C
Environmental humidity	20~90% RH (no condensation)
storage temperature	-20~60°C
Storage humidity	20~90% RH (no condensation)
Vibration-resistant	not exceeding 4.9 m/s ²
above sea level	Do not exceed 1000m. When exceeding 1000m, use at reduced capacity (reduce by 1% for every 100m elevation).
cooling-down method	forced air cooling

2.1.3 Product dimensions

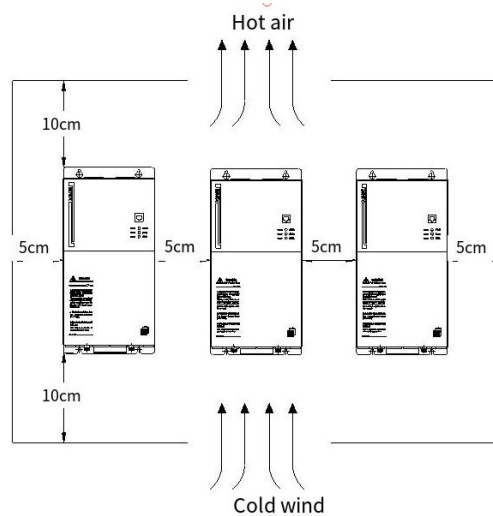
The external dimensions of the DM6 series brake units are shown in the figure (unit: mm).



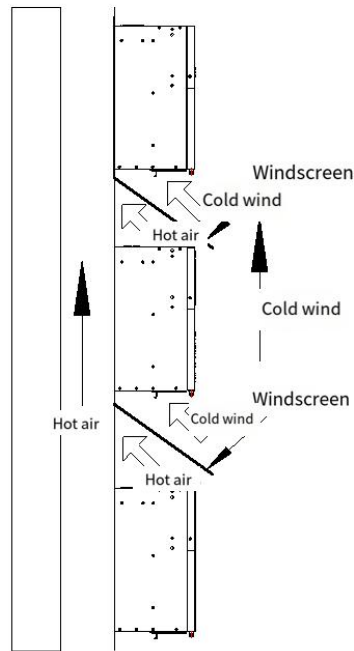
2.1.4 Installation standard

Please strictly adhere to the installation standards for control cabinets shown in the figure below, which apply when multiple brake units are installed side by side within the control cabinet.

■ dimensions for side-by-side installation of the braking unit



■ Vertical installation dimensions of braking module



■ Installation Recommendation

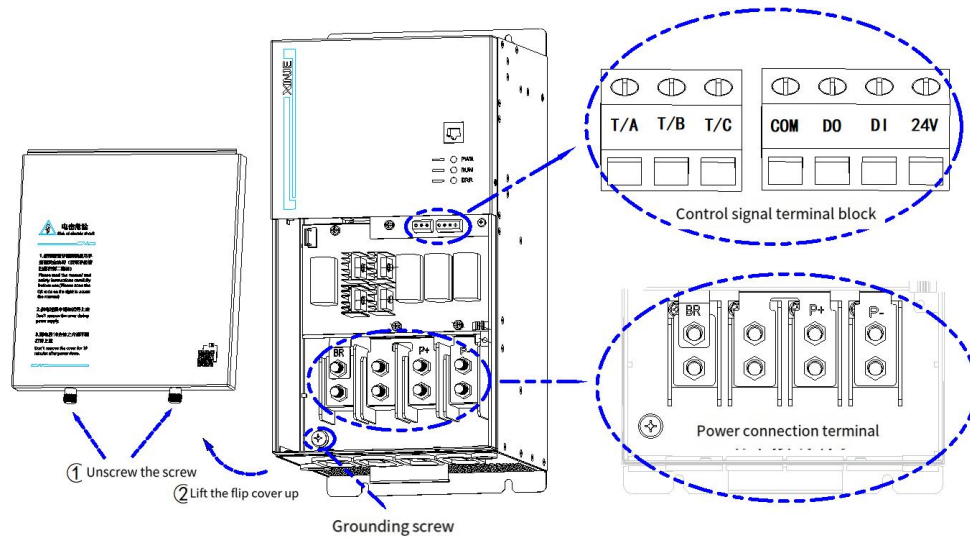
- During braking, since the feedback energy is primarily dissipated through heat generation in the brake resistor, the brake resistor must be installed in a well-ventilated space.
- The braking module is recommended to be installed side by side. If vertical installation is required, install thermal insulation baffles to prevent heat transfer from lower equipment to upper equipment, which may cause damage.
- The braking unit must be installed at a distance of at least 50 mm laterally and 100 mm longitudinally from other electrical equipment.
- To prevent localized overheating of the brake unit's ambient temperature, the temperature inside the control cabinet must be maintained uniformly.
- During installation, position the front of the brake unit (the operator's actual installation surface) facing the operator and ensure it is perpendicular to the wall. For drivers equipped with brake resistors at the bottom, pay attention to heat dissipation on the installation surface to prevent overheating and potential fire hazards.
- To ensure effective cooling through fans and natural convection, refer to the diagram above and leave sufficient space around the braking unit.

■ Environmental conditions inside the control cabinet

- The operating ambient temperature of the braking unit: -10 to 40°C.
- Humidity: below 90% RH (relative humidity).
- Vibration: 4.9 m/s².
- Avoid occurrence of freezing, condensation, or similar phenomena.
- To ensure long-term reliability, use the device in environments with temperatures below 50°C.

2.2 electrical installation

2.2.1 Terminal Introduction Diagram



2.2.2 Terminal Function Description

2.2.2.1 Power Terminal Description

Terminal marking	name	explain
P+, P-	Positive and negative terminals of the DC busbar	Common DC bus connection, terminal connected to the driver
P+, BR	braking resistor	Connected to the braking resistor
Grounding screw	Grounding terminal	Grounding terminal



- Reverse polarity connection between P+ and P-terminals is strictly prohibited, as it may directly cause the explosion of the driver and brake unit.
- The grounding terminal must not be shared with the power supply neutral line N.
- The grounding terminal of the grounding screw must ensure reliable grounding.
- The wiring length between the braking unit and the driver should not exceed 5 meters, while that between the braking unit and the brake resistor should not exceed 10 meters.

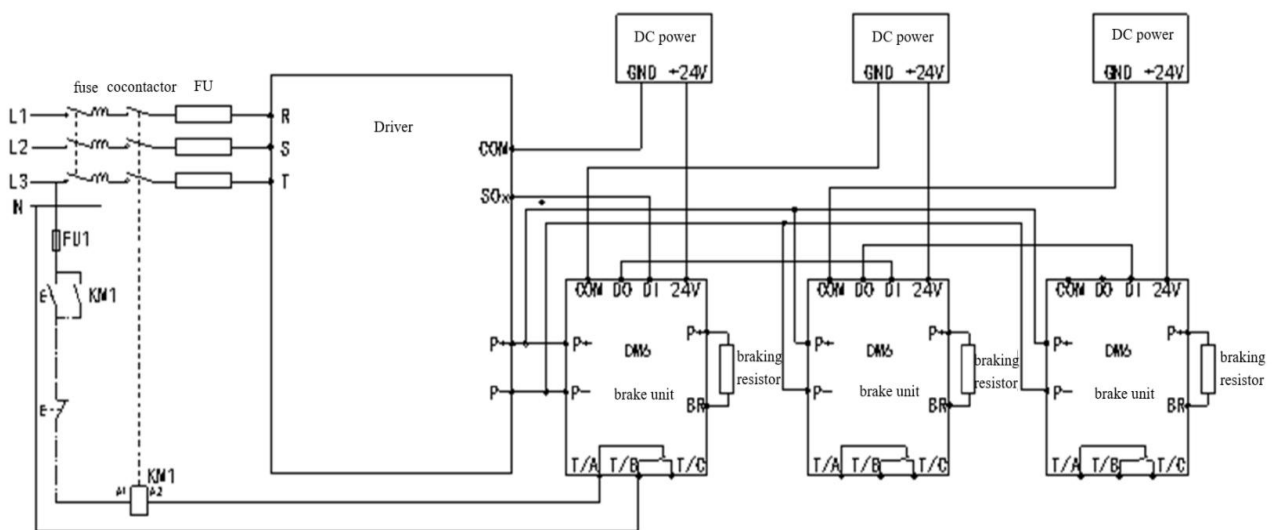
Terminal marking	name	explain
DI	signal input	Host mode: External fault input; when the DI signal is valid, the braking unit stops operating and the braking resistor remains open. Slave mode: The brake unit operates/stop based on input,

Terminal marking	name	explain
		starting work when the DI signal is valid.
DO	signal output	Signal output for operation/stop: The brake unit outputs valid signals when in operational status.
T/A、T/B、T/C	fault relay output	TA/TB normally closed contact, TA/TC normally open contact; Action method: The system activates when the braking unit fails, causing the normally closed contacts of TA/TB to open and the normally open contacts of TA/TC to close.
24V、COM	Power/Common Terminal	Common terminal of input-output loop and reference ground



- The device features low-speed input (using a low-speed bidirectional optocoupler) and supports both NPN and PNP connection configurations.
- Power Supply: The typical supported voltage is 24 VDC, with a minimum recommended voltage of no less than 18 VDC and a maximum recommended voltage not exceeding 30 VDC.
- The one DO device operates at low-speed output (using low-speed optocouplers for dual-channel operation) and supports only NPN wiring configuration.
- T/A, T/B, and T/C are relay terminals with the following specifications:
NC: 3A 250V AC /1A 30V DC
NO: 3A 250V AC /1A 30V DC
- Recommended cable dimensions: P+, P-, BR cables (70mm²); ground cables (35mm²); recommended terminal width: 26.8mm.

2.2.3 Braking module wiring diagram

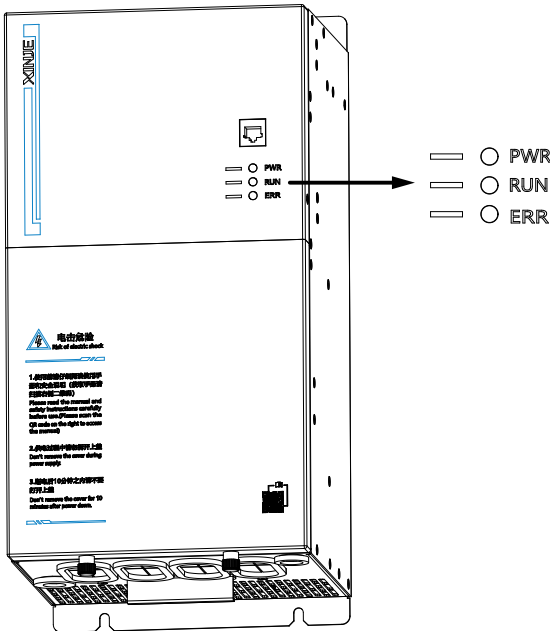




- When multiple brake units are connected in parallel, ensure that relays T/A, T/B, and T/C are only connected to the control of the first brake unit.
 - When the driver fails, a fault signal is sent via the SO terminal to the first braking unit, causing it to cease control. The normally closed contacts of T/A and T/B open, while the normally open contacts of T/A and T/C close, resulting in the control circuit breaker opening and the driver's power supply lines L1, L2, and L3 being disconnected.
 - Before the driver's SO terminal outputs a fault signal, configure the relevant fault output parameters, such as P5-47=0002 (controlled via the driver's SO2 terminal).
 - When multiple brake units are connected in parallel, follow the wiring diagram for control: the output signal from the DO terminal of the preceding unit activates the next brake unit, and so on.
 - When multiple brake units are connected in parallel, each unit must configure the master-slave mode via the external interface panel P0-00. The host unit should set P0-00=0, while all slave units should set P0-00=1.
 - Pay attention to the functional terminal control circuit system and avoid incorrect wiring.
-

3 Operation panel usage and display

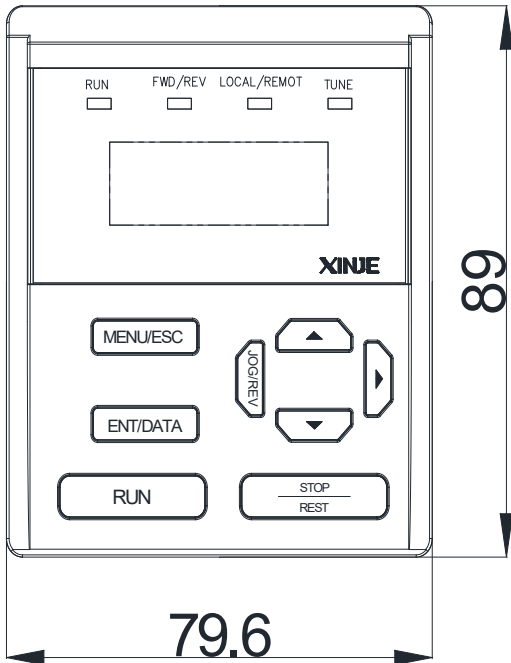
3.1 Product Panel Introduction



pilot lamp	meaning	explain
PWR	power light	The LED yellow light remains on after power-on
RUN	Work indicator light	During discharge, the LED green light flashes; when discharge is rapid, the LED green light remains on continuously.
ERR	fault indicating lamp	The LED red light remains illuminated during a fault.

3.2 Parameter Settings and Panel Introduction

The braking module may be optionally equipped with an external control panel for setting operational parameters. The appearance of the control panel is shown in the figure below (unit: mm):



- The external lead panel models for the Sijie adaptive braking unit are VH6-PE100 and VH5-PE100 (not displayed).
- Recommended adapter cable: Standard RJ45 network cable.

3.2.1 Keyboard Function Description

The frequency converter's operation keyboard features eight buttons, with their functions defined as follows:

key	name	function declaration
	Programming/Exit Key	Enter or exit programming mode
	Storage/Switch Key	Used to access the next menu level or store parameter data during programming mode.
	Keep	-
	Stop/Reset button	Shut down/Reset after failure
	Multifunction buttons	In edit mode, you can select the modification bits for data settings; in other modes, you can toggle display status monitoring parameters.
	Add key	Increasing data and parameters

key	name	function declaration
	Key reduction	Decreasing data and parameters
	Shift/Monitor key	In edit mode, you can select the modification bits for data settings; in other modes, you can toggle display status monitoring parameters.

3.2.2 Display of external panel

show	meaning	explain
IDLE	Braking module not functioning	The braking module is currently inactive with the brake resistor open, causing the yellow light to remain illuminated.
RUN	During brake module operation	The braking module is currently in a braking state, with the green light flashing rapidly. A single discharge from the braking unit will keep the green light on for at least 50 milliseconds.
E-XXX	Braking module failure	The braking module is currently in an alarm state with the red light persistently illuminated and the green light constantly extinguished.
RST	Power needs to be reset	The braking module requires power disconnection, during which the panel flashes and the braking resistor opens.

3.2.3 Explanation of Digital LED Displays and Indicator Lights

The external display panel features five 7-segment LED displays and four status indicator lights. Four status indicators are positioned above the LED digital display, arranged from left to right as follows: RUN, FWD/REV, LOCAL/REMOT, and TUNE. The table below provides descriptions of the indicator lights on the brake unit's external panel.

pilot lamp	meaning	function declaration
RUN	Keep	-
FWD/REV	Keep	-
LOCAL/REMOT	Keep	-
TUNE	fault indicating lamp	Light extinguished: normal state; Flashlight: Fault status.

3.2.4 External Panel Operation Method

The brake unit can be operated through the control panel for various functions, such as:

1) Switching of status parameter display

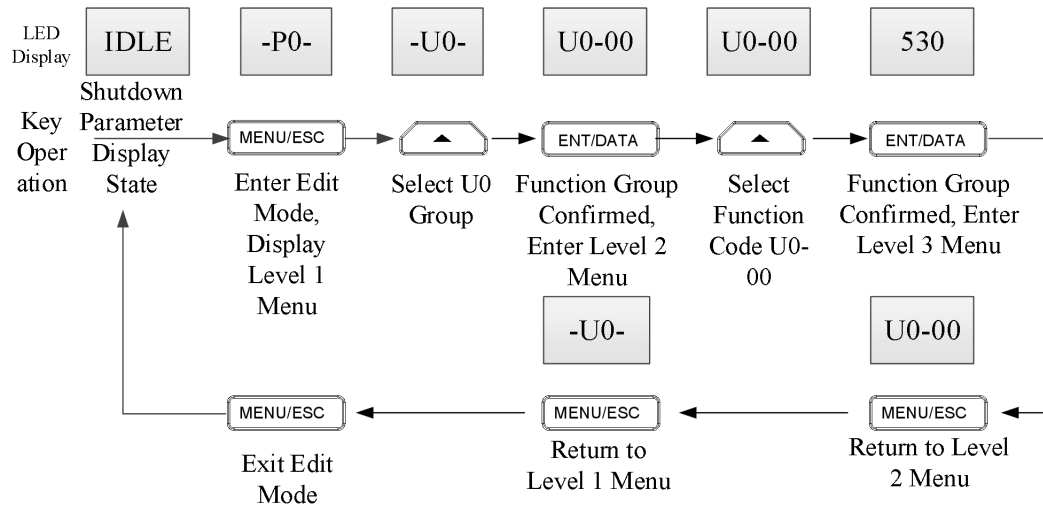
Method 1:

Press the  key to display Group U monitoring parameters. The serial number of the parameter is shown first, and after one second, the actual parameter value is automatically displayed.

When querying status monitoring parameters MENU/ESC, you can press the key to switch back to the default display state. The default monitoring parameter for shutdown status is bus voltage, and the default monitoring parameter for operating status is bus voltage.

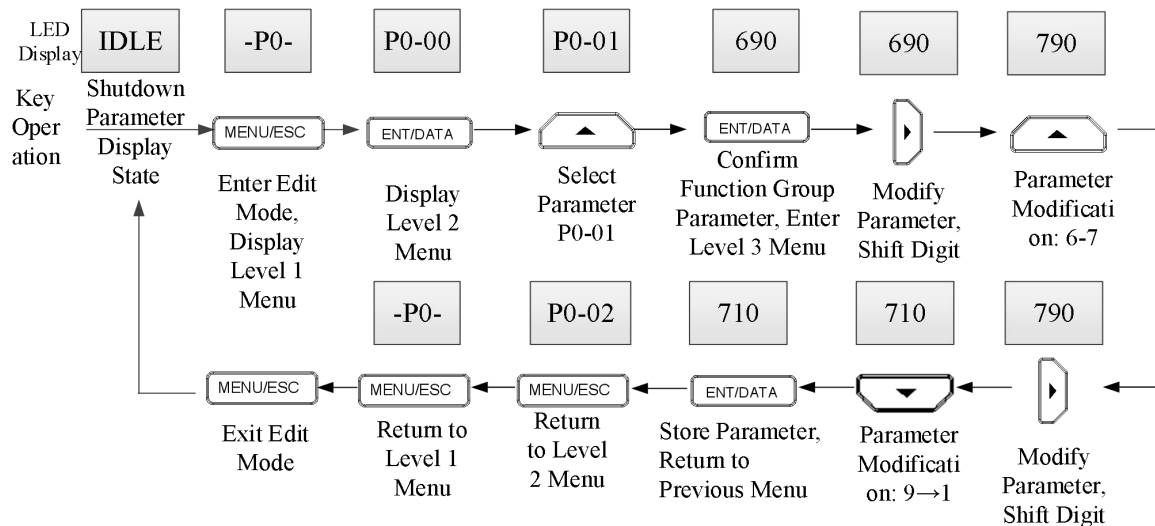
Method 2:

View U0 group parameters. For example, view U0-00.



2) Parameter settings

We will illustrate this using the modification of parameter P0-01 as an example.



In the third-level menu state, if a parameter does not have a flashing indicator, it means the parameter cannot be modified. Possible reasons include:

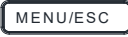
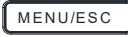
- (1) This parameter is non-modifiable, such as actual detection status parameters and operational record parameters;
- (2) This parameter cannot be modified during operation and must be adjusted after the system is shut down.

3) Fault status query and fault parameters

The fault status query method is identical to that of Group U0 monitoring parameters.

explain:

(1) When the fault code display state  is active, users can access the P0 group parameters by pressing the button.

(2) When querying fault parameters, users   can press a button to directly return to the fault code display mode.

3.3 Parameter List

3.3.1 Summary of Parameters for Group P

Group P0 parameter	explain	Windo ws default	Set range	Set timing	Trigger time
P0-00	control model 0: Main mode 1: From the pattern	0	0~1	Set during non-working hours	Power on again
P0-01	Braking starting voltage (V)	690	660~800	Set anytime	Effective immediately
P0-02	Brake stop voltage (V)	660	630~800	Set anytime	Effective immediately
P0-05	E-104 IGBT short-circuit current judgment threshold A	20	20~100	Set during non-working hours	Power on again
P0-06	Maximum continuous discharge time of E-106	20	5~60	Set anytime	Effective immediately
P0-08	E-105 open-circuit detection threshold A	10	10~50	Set anytime	Effective immediately
P0-09	E-101 Overcurrent Detection Threshold A	330	200~600	Set anytime	Effective immediately
P0-10	E-102 Overvoltage Detection Threshold V	780	750~1000	Set anytime	Effective immediately
P0-11	bus voltage offset value	0	-20~20	Set during non-working hours	Power on again

3.3.2 Parameter Overview of Group U

Parameter of Group U	explain
U0-00	busbar voltage (V)
U0-01	Busbar current (A)
U0-02	temperature (°C)
U0-10+N*0(N<5)	Recent N alarm codes
U0-10+N*1(N<5)	Bus voltage during the last N alarms
U0-10+N*2(N<5)	The bus current during the last N alarms
U0-10+N*3(N<5)	Temperature during the last N alarms

3.3.3 Parameter Overview of Group F

Parameter of Group F	explain
F0-00	Clear alarm
F0-01	factory data reset

4 Failure and Alarm Analysis

Category	Subcategory	confirm code	explain	Alarm mechanism
01	0	E-010	The software and hardware versions do not match	The software and hardware versions do not match
	2	E-012	Power mismatch	Power mismatch
02	0	E-020	Parameter loading failed	Failed to read EEPROM parameters. Failed to read EE parameters.
	1	E-021	Parameter out of bounds	Error occurred while reading EEPROM parameters. The read EE parameters exceed the limit.
10	0	E-100	Hardware overcurrent fault	Hardware overcurrent signal detected, brake signal valid, PWM output locked
	1	E-101	Software overcurrent fault	Busbar current exceeding the preset threshold P0-09 was detected during operation.
	2	E-102	Software overvoltage fault	The bus voltage exceeds the preset threshold of P0-10 at any time.
	3	E-103	Overtemperature fault	IGBT temperature exceeds the limit at any time (software threshold set at 95°C)
	4	E-104	IGBT short	When the braking unit is not in operation, the busbar current exceeds the P0-05 set value.
	5	E-105	Braking resistor or IGBT open circuit	The busbar current value is abnormal when the braking module is in operation.
	6	E-106	Continuous brake timeout	The braking module remains in a braking state for an extended duration exceeding the preset threshold P0-06.
	9	E-109	External alarm input	In host mode, the SI terminal receives the signal. Hardware damage

Manual update log

Information regarding the revision of the documentation is recorded together with the document number in the lower right corner of the cover page of this document.

order number	Document ID	chapters and sections	Update content
1	SM6 02 20250123 1.0	-	The first edition of the manual has been released.
2	SM6 02 20250723 1.0.1	-	The modified content is incorrect



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